



STPR1020CB/CG/CT/CF/CFP/CR

ULTRA-FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2 x 5 A
V_{RRM}	200 V
$T_j (max)$	150°C
$V_F (max)$	0.99 V
$t_{rr} (max)$	30 ns

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- INSULATED PACKAGES: ISOWATT220AB / TO-220FPAB
Insulation Voltage = 2000V DC
Capacitance = 12 pF

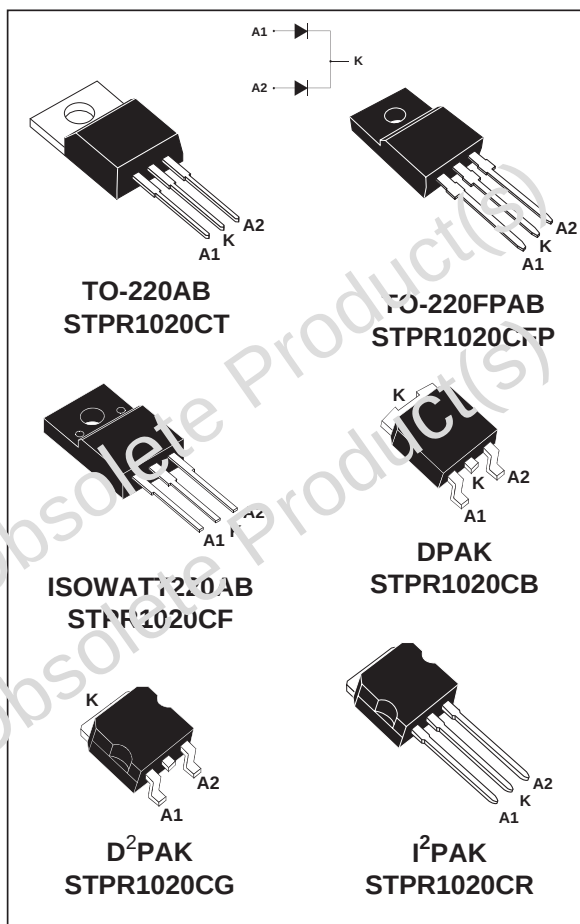
DESCRIPTION

Dual center tap rectifier suited for Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in DPAK, D²PAK, I²PAK, TO-220AB, TO-220FPAB or ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM (limiting values, per diode)

Symbol	Parameter				Value	Unit
V _{RRM}	Repetitive peak reverse voltage				200	V
I _{F(RMS)}	RMS forward current	D ² PAK / TO-220AB / ISOWATT220AB / TO-220FPAB / I ² PAK			10	A
		DPAK			7	A
I _{F(AV)}	Average forward current δ = 0.5	D ² PAK / DPAK TO-220AB / I ² PAK	Tc=125°C	Per diode	5	A
		ISOWATT220AB	Tc=115°C	Per device	10	
		TO-220FPAB	Tc=110°C	Per device	10	
I _{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal		50	A
T _{stg}	Storage temperature range				- 65 to + 150	°C



STPR1020CB/CG/CT/CF/CFP/CR**THERMAL RESISTANCES**

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / D ² PAK / DPAK I ² PAK	Per diode	4.0	°C/W
			Total	2.4	
		ISOWATT220AB	Per diode	6.0	
			Total	4.0	
		TO-220FPAB	Per diode	6.5	
			Total	5	
$R_{th(c)}$	Coupling	TO-220AB / D ² PAK / DPAK / I ² PAK		0.7	
		ISOWATT220AB		2.0	
		TO-220FPAB		3.5	

When diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			50	μA
		$T_j = 100^\circ\text{C}$				0.6	mA
V_F^{**}	Forward voltage drop	$T_j = 125^\circ\text{C}$	$I_F = 5\text{ A}$		0.8	0.99	V
		$T_j = 125^\circ\text{C}$	$I_F = 10\text{ A}$		0.95	1.20	
		$T_j = 25^\circ\text{C}$	$I_F = 10\text{ A}$			1.25	

Pulse test : * $t_p = 5\text{ ms}$, $\delta < 2\%$

** $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_{F(AV)} + 0.042 \times I_F^2 (RMS)$$

RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{ A}$ $I_R = 1\text{ A}$	$I_{rr} = 0.25\text{ A}$			30	ns
t_{fr}	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$ $V_{FR} = 1.1 \times V_F \text{ max}$	$dI_F/dt = 50\text{ A}/\mu\text{s}$		20		ns
V_{FP}	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$	$dI_F/dt = 50\text{ A}/\mu\text{s}$		3		V

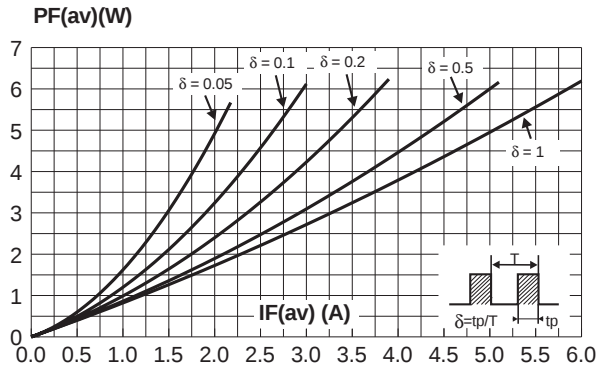
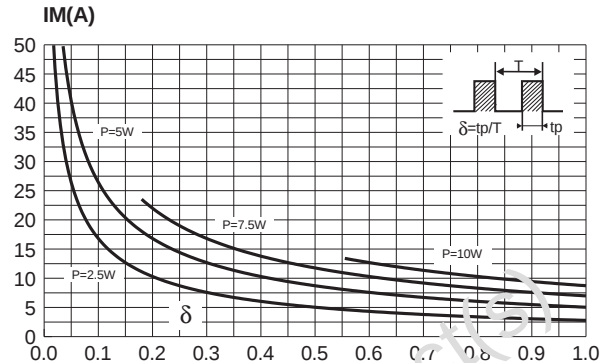
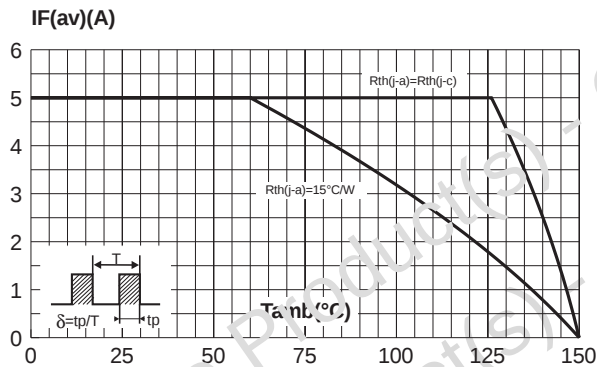
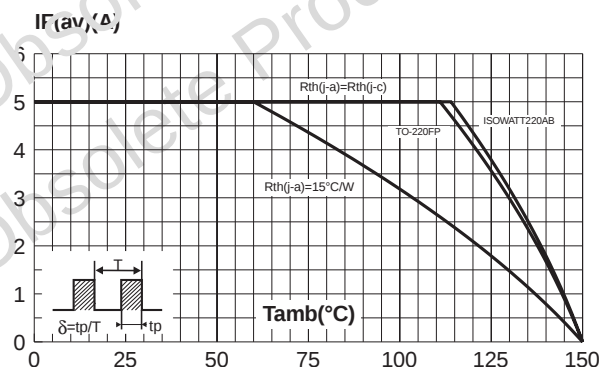
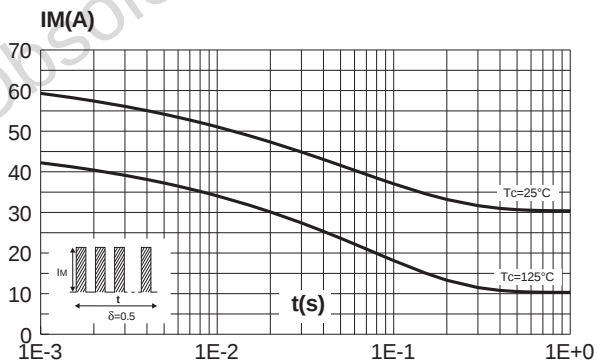
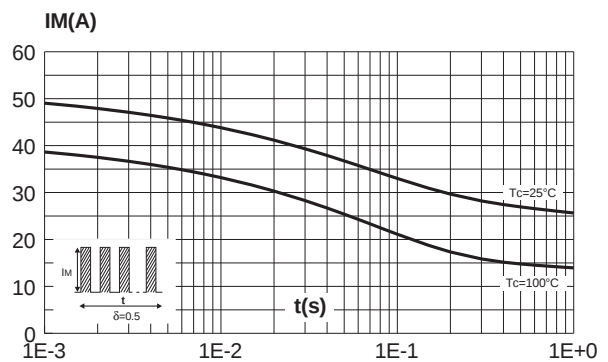
Fig. 1: Average forward power dissipation versus average forward current (per diode).**Fig. 2:** Peak current versus form factor (per diode).**Fig. 3-1:** Average forward current versus ambient temperature ($\delta = 0.5$, TO-220AB, DPAK, D²PAK).**Fig. 3-2:** Average forward current versus ambient temperature ($\delta = 0.5$, ISOWATT220AB, TO-220FPAB).**Fig. 4-1:** Non repetitive surge peak forward current versus overload duration (TO-220AB, DPAK, D²PAK).**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (ISOWATT220AB).

Fig. 4-3: Non repetitive surge peak forward current versus overload duration (TO-220FPAB).

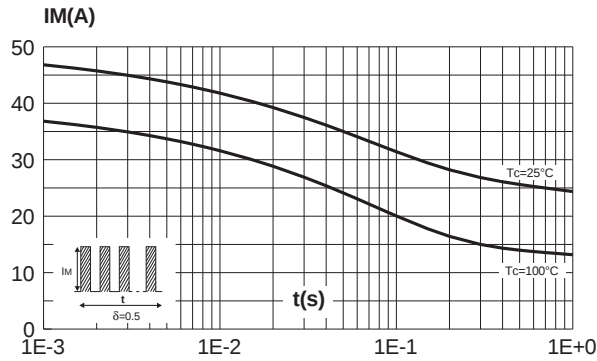


Fig. 5-1: Relative variation of thermal impedance junction to case versus pulse duration (D²PAK, DPAK, TO-220AB).

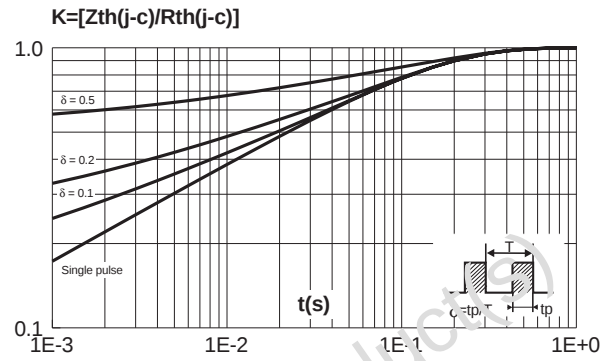


Fig. 5-2: Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

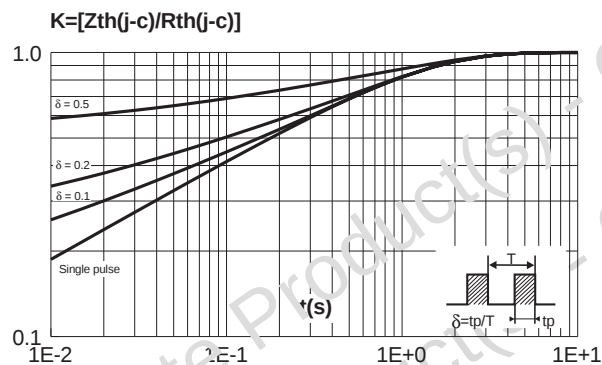


Fig. 6: Forward voltage drop versus forward current (maximum values, per diode).

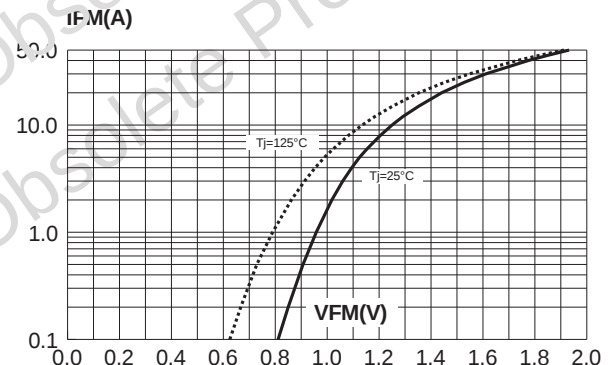


Fig. 7: Junction capacitance versus reverse voltage applied (typical values, per diode).

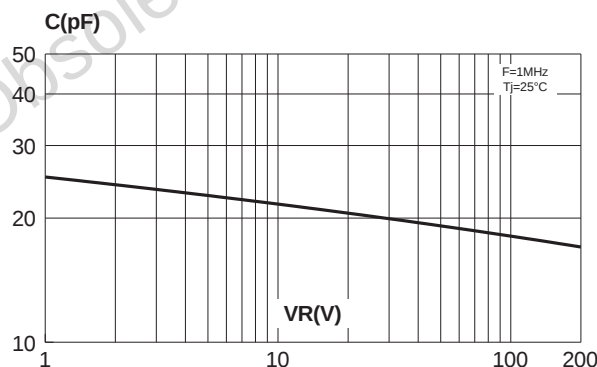


Fig. 8: Reverse recovery charges versus dIF/dt (per diode).

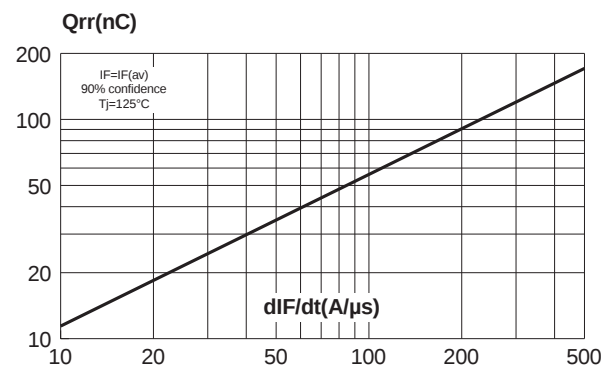


Fig. 9: Peak reverse recovery current versus dI_F/dt (per diode).

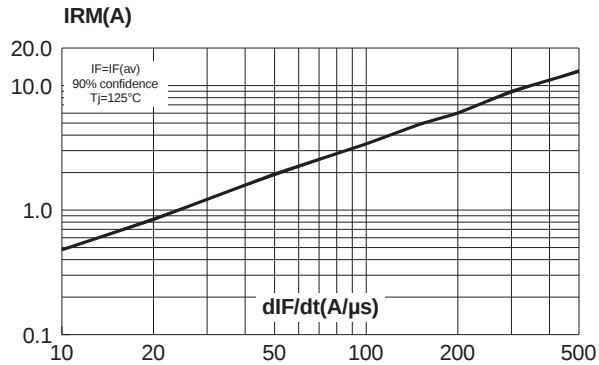


Fig. 10: Dynamic parameters versus junction temperature (per diode).

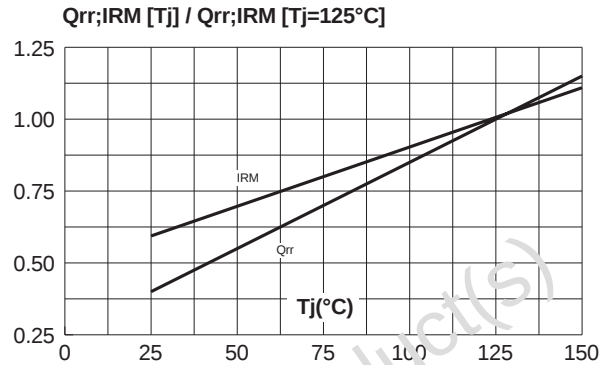
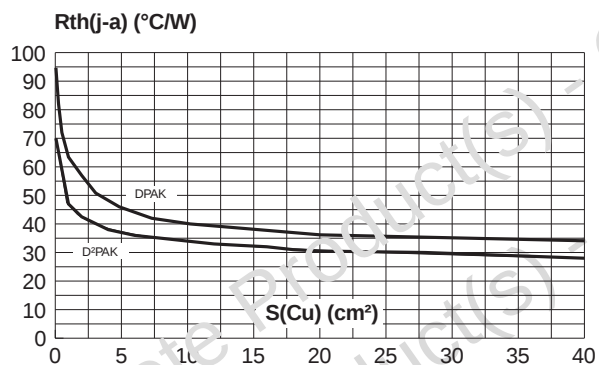
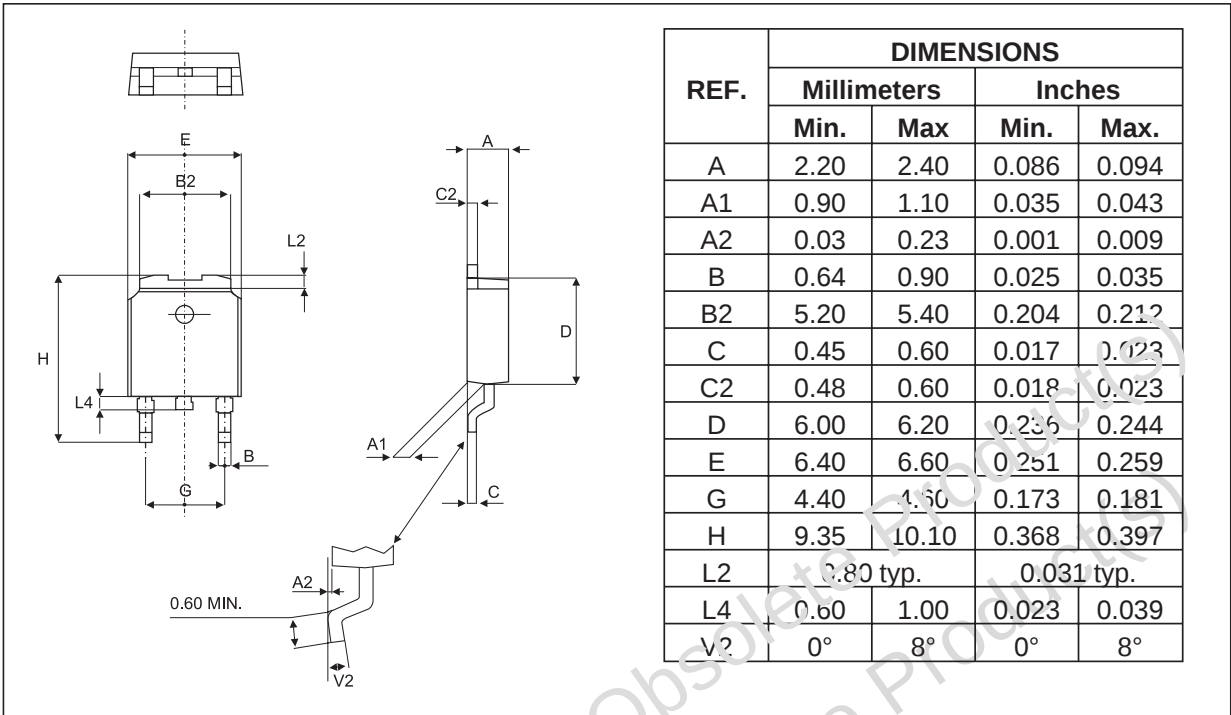


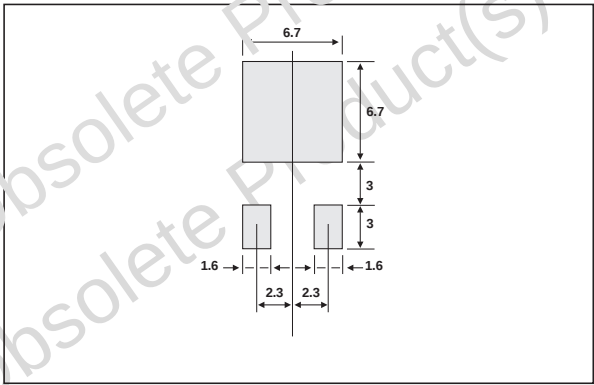
Fig. 11: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: $35\mu\text{m}$).

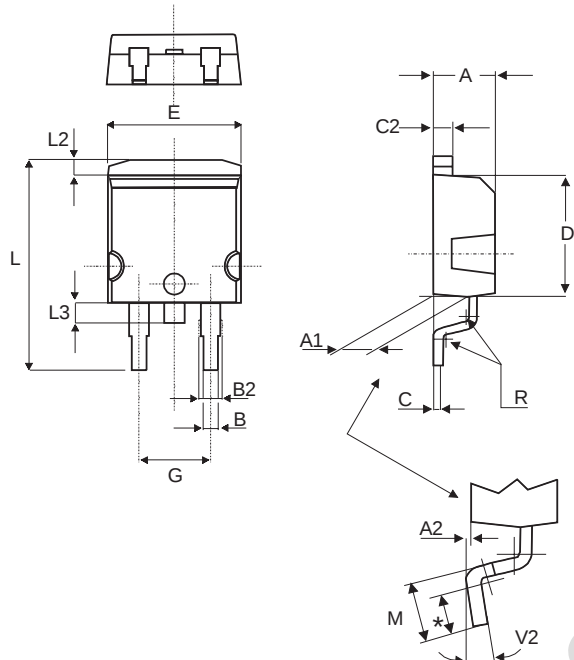


PACKAGE MECHANICAL DATA
DPAK

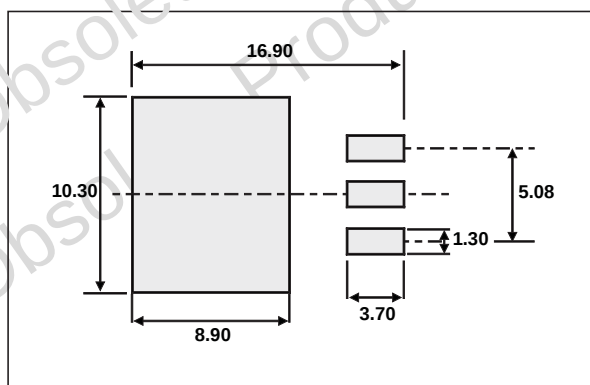


FOOT PRINT (in millimeters)
DPAK



PACKAGE MECHANICAL DATA
D²PAK


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

FOOT PRINT (in millimeters)
D²PAK


STPR1020CB/CG/CT/CF/CFP/CR

PACKAGE MECHANICAL DATA
I²PAK

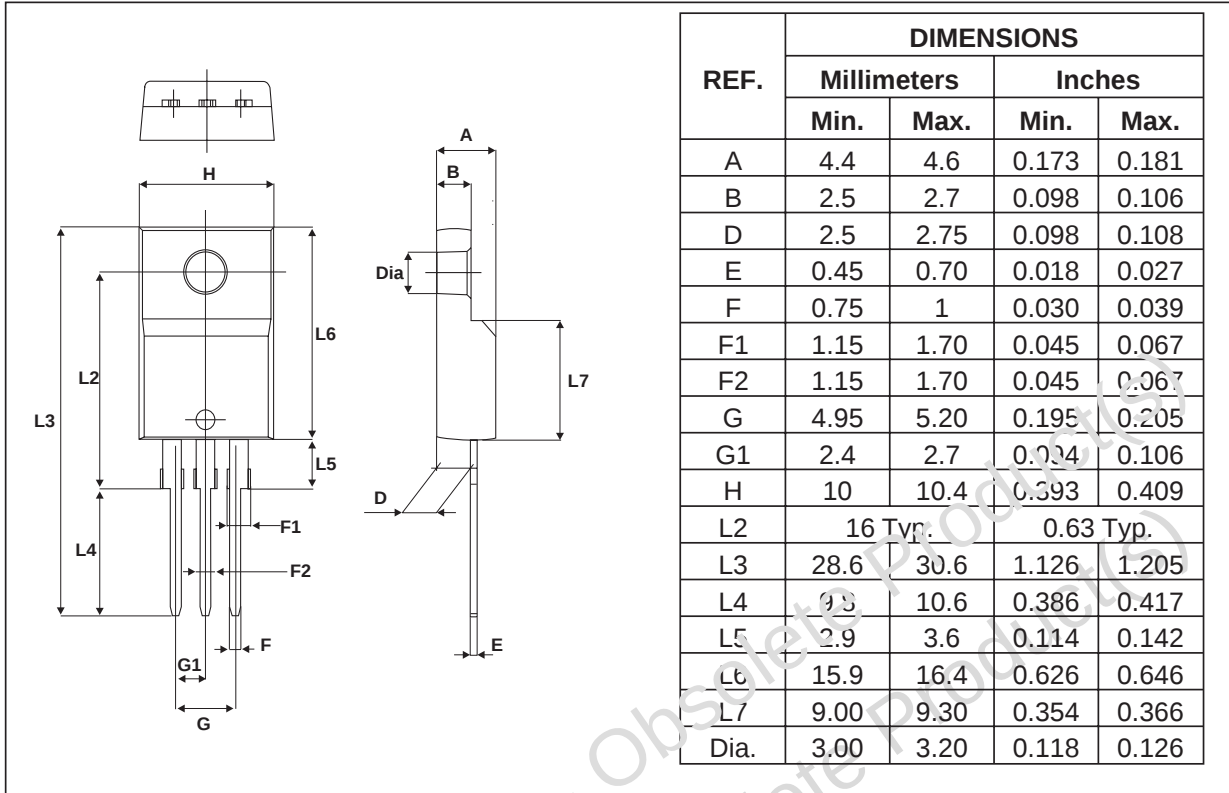
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149
L2	1.27	1.40	0.050	0.055

PACKAGE MECHANICAL DATA
TO-220AB (JEDEC compatible)

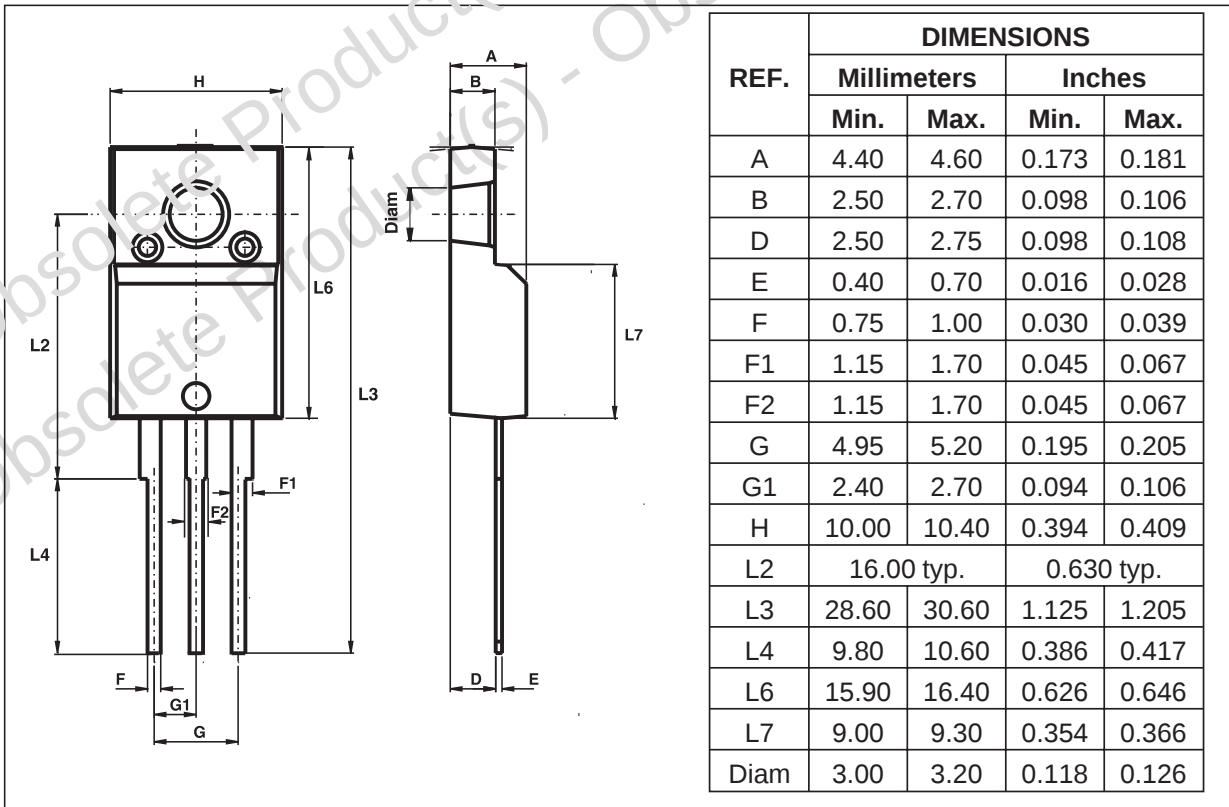
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.60	0.169	0.181
C	1.22	1.32	0.048	0.052
D	2.40	2.72	0.094	0.107
E	0.33	0.70	0.013	0.028
F	0.61	0.93	0.024	0.037
F1	1.14	1.70	0.045	0.067
F2	1.14	1.70	0.045	0.067
G	4.95	5.15	0.195	0.202
G1	2.40	2.70	0.094	0.106
H2	10.00	10.40	0.394	0.409
L2	16.00 Typ.		0.630 Typ.	
L4	13.00	14.00	0.512	0.551
L5	2.65	2.95	0.104	0.116
L6	14.80	15.75	0.583	0.620
L7	6.20	6.60	0.244	0.260
L9	3.40	3.94	0.134	0.155
M	2.60 Typ.		0.102 Typ.	
Dia.	3.75	3.89	0.148	0.153

STPR1020CB/CG/CT/CF/CFP/CR

PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATA
ISOWATT220AB (JEDEC compatible)



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPR1020CB	STPR1020CB	DPAK	0.3g	75	Tube
STPR1020CB-TR	STPR1020CB	DPAK	0.3g	2500	Tape & reel
STPR1020CT	STPR1020CT	TO-220AB	2.23g	50	Tube
STPR1020CF	STPR1020CF	ISOWATT220AB	2.2g	50	Tube
STPR1020CG	STPR1020CG	D ² PAK	1.48g	50	Tube
STPR1020CFP	STPR1020CFP	TO-220FP	2.0g	50	Tube
STPR1020CR	STPR1020CR	I ² PAK	1.49 g	50	Tube

- Cooling method : by conduction (C)
- Recommended torque value (ISOWATT220AB, TO-220FPAB): 0.55 N.m.
- Maximum torque value (ISOWATT220AB, TO-220FPAB): 0.70 N.m.
- Recommended torque value (TO-220AB): 0.8 N.m
- Maximum torque value (TO-220AB): 1.0 N.m.
- Epoxy meets UL94,V0

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